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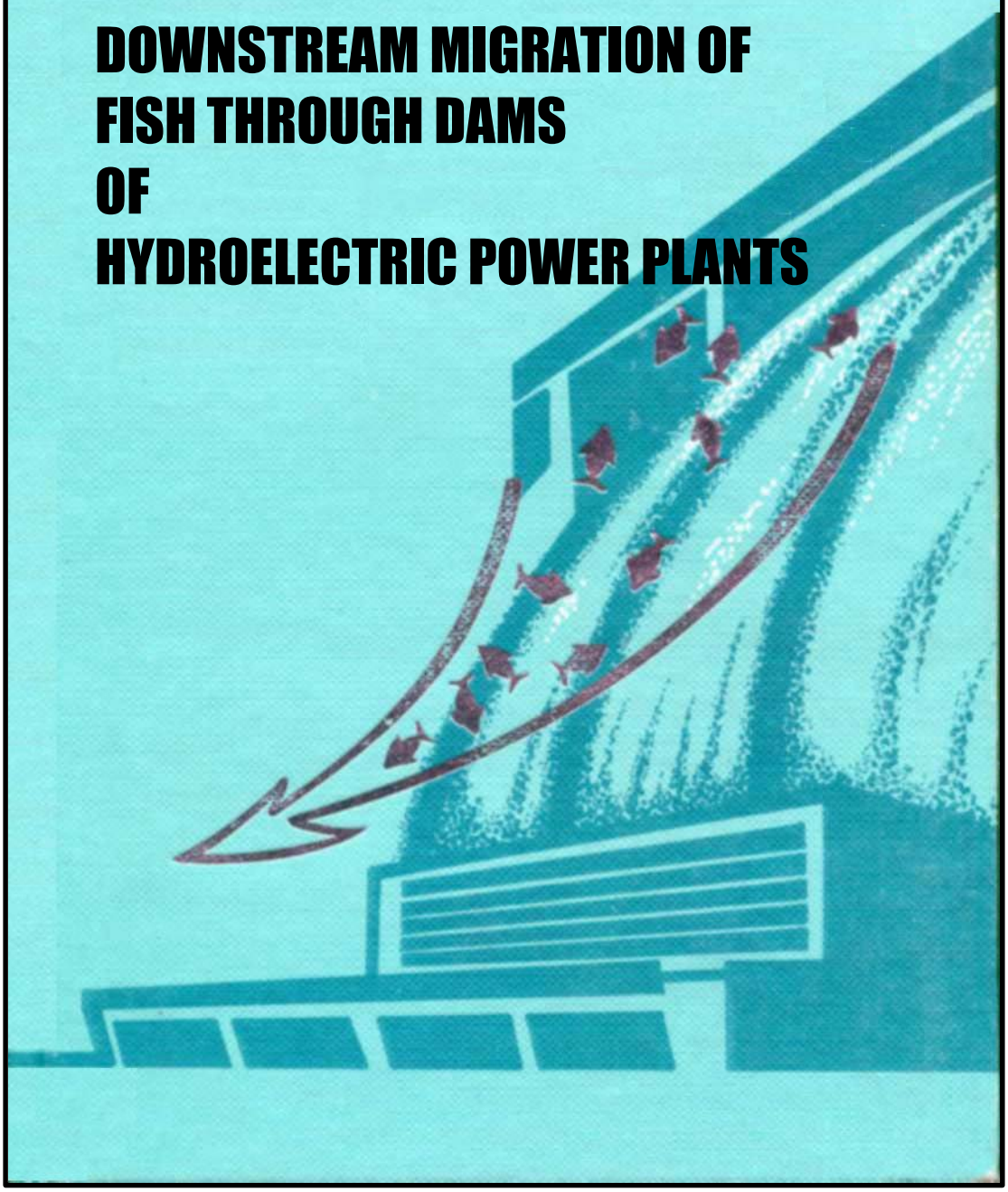
# DOWNSTREAM MIGRATION OF FISH THROUGH DAMS OF HYDROELECTRIC POWER PLANTS



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# DOWNSTREAM MIGRATION OF FISH THROUGH DAMS OF HYDROELECTRIC POWER PLANTS

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This book is a fundamental research in migration and it describes how the regulated river flows affect fish downstream migration. The book provides information on 45 reservoirs, and it contains a comparative analysis of patterns (species and sizes of the downstream fish migrants, as well as seasonal and daily dynamics of their migration) and migration mechanisms through dams of hydroelectric power plants (HPPs). It has been shown that the major factor affecting fish downstream migration is the influence of the water intake. The book gives data on fish injuries at their passage through the HPP turbines.

*The book is intended for ichthyologists, those who deal with the protection of fish resources, as well as for hydroelectric and hydrotechnical engineers and fish industry experts.*

# Forward to the English Edition

Russian scientists have been contributing to the understanding of hydropower effects on fish populations for decades, but many of their publications have not been readily available to the international research community. This translation has been produced to help address that problem.

In this book, originally published by Nauka Press in Moscow in 1999, the authors summarized and integrated years of work in European and Asian river systems and the efforts to understand how regulated river flows affect downstream movements of fish. They summarized considerable literature on the ecological preferences of fish (especially juvenile fish) in Eurasian reservoirs and categorized species by habitat zones. The book considers the patterns, causes, and mechanisms for downstream movements, and it assesses the susceptibility of fish to loss from the reservoir, as a function of species, life stage, habitat zone preferences, and characteristics of the reservoir. Lastly, the book describes the effects of turbine passage and techniques to mitigate turbine-passage losses of fish.

I have endeavored to retain a literal translation of the text. Thus, two terms warrant explanation. Foremost is the term "migration." To many fisheries biologists, "migration" connotes long-distance, purposeful movements, and is most commonly used with reference to movements of diadromous fish. The authors appropriately use the term in a more general sense to describe active or passive movements of fish within and out of reservoirs. In the context of the resident fishes that are the subject of most of the studies summarized in this book, the term "migration" is more likely to mean the unintended loss of resident fish from the reservoir than the volitional downstream movements of juvenile anadromous fish. Similarly, their frequently used term "reservoirs with slow water exchange" is akin to our terms "slow turnover rate" and "slow flushing rate."

One of the many values of this book is that it provides information about Eurasian fish species that may be unfamiliar to fisheries scientists in North America. In translating the Russian common names of fishes to English, I have relied on the FishBase database [Froese, R., and D. Pauly, eds. 2001. FishBase. World Wide Web electronic publication (http://www.fishbase.org). Accessed 8 February 2002.]

I would like to express my appreciation to others who have helped bring this book to a wider audience. D. S. Pavlov, A. I. Lupandin, and V. V. Kostin graciously agreed to our translation and distribution of their work. Tatyana Albert provided the original translation, and Carolina Ravina helped refine it, both through her own skills and by consulting with the authors. Peggy Brookshier and John Flynn of the U.S. Department of Energy's Hydropower Program recognized the value of this information and this effort. The responsibility for any errors in the translation of this book is mine.

Glenn F. Cada, Ph.D.
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